

**OPERATOR'S
MANUAL
H 42-5**



OPERATOR'S MANUAL

H 42 - 5

automatic coating machine

max. frame size (outer)

3250 mm x 5300 mm (width x height)

Serial - No. : 42.6391

HARLACHER AG
Kammistrasse 11
CH - 3800 Interlaken
Schweiz / Switzerland

Tel ++41 33 827 02 10
Fax ++41 33 827 02 15
e-mail: harlacher-ag@bluewin.ch

Technical data for H 42 - 5 S/N 42.6391

Date of manufacturing	05.2001
Software	SPS V 02.13 / display V 01.06
Electrical connection	3 x 220 V (+6/-10%) + PE 50 / 60 Hz
Power consumption / current	0.8 kW / 3.5 A
Compressed air supply (dry)	5 to 10 bar , up to 5 litre / min.
Noise emission	below 70 dB
Colours	blue RAL 5017 / grey RAL 7142
Additional extras	2 x wall fixations

Observe : Before connecting / using above machine, you **must read this manual completely and carefully** to avoid any injuries or damages !!

Register

	Page
1) General information	
1.1 <i>Range of application</i>	3
1.2 <i>Correct length of coating trough's</i>	3
2) Safety - rules	
2.1 <i>Introduction</i>	4
2.2 <i>Warnings and danger signs</i>	4
3) Installation and commissioning tests	
3.1 <i>Location of the machine</i>	5
3.2 <i>Transportation and unpacking</i>	5
3.3 <i>Installation and assembling</i>	6
3.4 <i>Electrical connection</i>	8
3.5 <i>Compressed air supply</i>	8
3.6 <i>Performance test</i>	9
4) Setting up and preparation	11
5) Manual mode (movements)	
5.1 <i>Screen fixation</i>	13
5.2 <i>Upper frame holder</i>	13
5.3 <i>Coating carriage</i>	14
5.4 <i>Dryer</i>	14
6) Manual pneumatic functions (for maintenance only)	
6.1 <i>General</i>	15
6.2 <i>Coating troughs in and tilting up</i>	16
6.3 <i>Frame holding clamps</i>	16
6.4 <i>Edge cleaning system</i>	16

7) Programming	
7.1 General	17
7.2 Direct coating (wet / wet)	17
7.3 Capillary film sheet	18
7.4 Direct coating / drying	(Option) 18
7.5 Edge cleaning dry	(Option) 20
7.6 Edge cleaning wet	(Option) 20
7.7 Capillary film roll application	(Option) 20
7.8 Middle supporting cylinder (wide mach.)	(Option) 21
7.9 Multiple coating	(Option) 21
7.10 Language	21
7.11 Activating / deactivating options	21
8) Program - cycles	
8.1 General	22
8.2 Direct coating (wet / wet)	22
8.3 Capillary film sheet	23
8.4 Direct coating / drying	23
8.5 Capillary film roll application	25
8.6 Multiple coating	25
9) Interrupting a running program	26
10) Function monitoring and error messages	26
11) Manufacturer - and machine data	27
12) Maintenance instructions	27
13) Drawings	29
14) Wiring diagrams	32
1) <u>General information</u>	

1.1 Range of application

This machine is intended for coating flat screen printing stencils vertically with photo-emulsion or optional with capillary films. It will coat coarse to fine mesh made of polyester, nylon or stainless steel, attached to suitable printing frames with max. specified dimensions (outside) shown on front page of manual. The minimum screen tension for photo-emulsion is approx. 10 N/cm and for capillary films 15 to 20 N/cm.

1.2 Correct length of coating troughs

The standard coating trough length can be calculated according to the list below. The trough's are normally delivered as a pair, where the front trough (squeegee side, SS) has red end caps and is always 20 mm or 4/5" longer than the rear one (printing side, PS) with black end caps. Do not use pairs with less difference and always mount the red one in front of the machine.

Observe: Be very careful with very large format frames, the bending in the middle of the frame needs to be measured, not to collide there with the red (SS) coating trough !

Frame width A (inside dimension)	100 - 500 mm 4" - 20"	501 - 1000mm 21" - 40"	1001- 2000mm 41" - 80"	over 2001mm over 81"
Trough length front (SS, red)	A - 40 mm A - 1 1/2"	A - 50 mm A - 2"	A - 70 mm A - 2 3/4"	A - 100 mm A - 4"
Trough length rear (PS, black)	A - 60 mm A - 2 1/3"	A - 70 mm A - 2 3/4"	A - 90 mm A - 3 1/2"	A - 120 mm A - 4 3/4"

2) **!!! Safety rules !!!**

2.1 Introduction

All HARLACHER machines are designed for maximum safety of personnel, machine and material. They are in conformity with the provisions of the significant directives and standards (CE).

This machine is determined for industrial use and must be operated by trained staff only !

This OPERATOR'S MANUAL , especially its safety instructions and danger signs must be obeyed at all times !

2.2 Warnings and danger signs



DIRECTIONS	information about technical requirements. Disobeying directions may lead to machine failures or loss of material
-------------------	------------------------------------------------------------------------------------------------------------------



CAUTION	points of danger which may lead to damage of the machine and / or light to medium injuries
----------------	--------------------------------------------------------------------------------------------



WARNING	points of danger which may lead to serious injuries and / or permanent physical damages
----------------	-----------------------------------------------------------------------------------------

3) Installation and commissioning tests

3.1 *Location of the machine*

The location of the machine should be determined according to the following aspects :

- room without direct daylight or with covered windows
- yellow light
- hard, vibration free floor
- short distance between coating machine and drying compartment
- dust free environment , constant room temperature - and humidity

The required space for the machine depends on its size and type :

- the space between the rear side of the machine and a wall must be at least 50 cm for standard machines, 80 cm for machines with film applicators
- on both sides of the columns (towers) there must be space of at least 65 cm for maintenance access. Machines equipped with frame side - loading (option) must have additional space of at least the width of the largest screen plus 20 cm for loading / unloading.
- in height there must be at least a 30 cm space between the towers and the ceiling for the erection and maintenance of the machine.
- in front of the machine there should be at least 150 cm space for screen handling and machine operation, for larger formats even more.

3.2 *Transportation and unpacking*



WARNING suitable equipment must be used for lifting and transportation of the crates and heavy machine parts !

Move the crates as close as possible to the planned location of the machine. Carefully open the top lid of the crates (on fully assembled machines the long front - side) and check their contents.

In case of shipping damages or losses immediately stop unpacking and contact HARLACHER or its agent, the freight forwarder and the shipping insurance to get further instructions.

Remove all parts carefully from the top to the bottom. To finally have better access to the heavy towers, remove the sides of the crates completely.

3.3 *Installation and assembling*



WARNING suitable equipment must be used for handling of heavy machine parts. Secure columns (1/2) during and after erection to prevent them from tipping over until consoles (3/4) and possibly wall fixations are mounted. Wall fixations are a must from screen heights of 3000 mm and above !

If the machine is delivered in sub - assemblies, final assembly should be done according to the instructions below. If the machine is delivered fully assembled (small formats only), you can start directly with levelling, connecting and then with the performance test.

- 1) set up control column (1), then align and level it carefully
- 2) attach lower console (3) loosely to the control column (see numbering). Support lower console to stay in levelled position
- 3) attach right hand column (2) loosely to the lower console and level it as well
- 4) place the upper console (4) with its opening facing upwards onto a forklift. Place the two or three hextubes (drive shafts) into the console and drive it up between the two towers to the level of the screw holes. Mount the console with the four screws loosely to the towers.
- 5) position the lower console so that the four steel location pins can be inserted. Then level the console and the two towers before definitely tightening all four screws.
- 6) now insert the steel location pins into the upper console and tighten the screws definitely.
- 7) if wall supports are included, these should now be attached (drilled and

- screwed) between a wall and the top of the towers (check levelling again).
- 8) fix the right hand bearing plate (7) of the coating carriage (8) at the same height as the left hand plate. Slide both hex plugs of the middle drive shaft into its holes in the towers (keys) and tighten all screws.
 - 9) now slide the coating carriage (8) from the front between the bearing plates onto the lower guiding (watch for the limit switch underneath) so that the tube (14) is on the left hand rear side. Then screw the side plates of the carriage to the bearing plates (M6 x 12 mm). Check the levelling of the carriage in both directions (X / Y) and correct with the two screws underneath the guides on the bearing plates. If the long profile of the carriage cannot be levelled by the four screws, then the carriage has to be supported and the right hand belt has to be loosened to jump over the tooth wheel on top of the tower. Repeat fine levelling again.
 - 10) guide the big tube (14) with the cables and pneumatic tubes into the control tower and connect everything inside according the numbering.
 - 11) fix the left hand bearing plate of the upper frame holder (30) on the front guide at the same level as the right one. Now mount the front drive shaft the same way as the previous one. Slide the upper frame holder, with the clamp - cylinders (27) facing to the front, between its bearing plates and fix it temporarily with its screws. Connect the pneumatic tubes (26) from the upper console to the upper clamps (27), repeat with the lower clamps from the lower console. Pull the power cable from the control tower through the upper console into the r/h tower and connect the upper frame holder motor.
 - 12) if the machine is equipped with hot air drying (25) at the rear side, the same procedure applies as for the upper frame holder. Observe that the big tube with the cables for the heater (9) is located at the right hand rear side. Slide the heater in from the back and fix it with its screws. After levelling etc. insert the tube (9) with the cables into the r/h tower, guide the cables to the top and through the upper console and then down the control tower to get connected. Pull the power cable to the heating drive motor the same way but in opposite direction and connect the motor.
 - 13) pull the cable of the foot pedals (12) underneath the lower console to the rear side of the control tower and plug it into its connector
 - 14) now the machine has to be connected electrically as well as pneumatically by licensed tradesmen.
 - 15) read in (chapter 5.3) how the carriage and in (chapter 5.2) how the upper frame holder can be moved
 - 16) drive the carriage completely down onto its limit switch (16). Open the clamps via foot pedal (chapter 5.1). Insert a clean and straight frame without any mesh and drive the upper frame holder down, until it sits on the frame (31). Close the clamps again and check, if the frame is exactly vertical on both sides. If not, loosen the screws in the slits at the sides of

the frame holder (30) and shift the plates until they match the correct angle. After tightening all four screws please check, if the upper frame holder.

is parallel to the lower frame holder (10). If not, it can be adjusted by the two screws on either side on the belt lock (slits).

Disassembly of the machine is done in reverse order. Make sure, that in this case the electrical power as well as the pneumatic supply is disconnected before starting !

Mark all parts before disassembling, it saves time in the following step.

3.4 *Electrical connection*



WARNING

the electrical connection must be done by a licensed electrician according to the supplied diagram as well as to the specifications on page 1 of this manual.

3.5 *Compressed air supply*



CAUTION

shut off the air supply hose before you connect and secure the delivered auto – lock quick fitting. Then plug it onto the inlet on the rear side of the control tower. Be aware that the electrical main switch does not shut off the air pressure !! Therefore always disconnect the air supply before working on the pneumatic system !

Connect only clean and dry compressed air to the inlet with minimum 5 bar pressure (ideal approx. 6 to 7 bar).

Check for adjusted pressure on the manometer inside the control tower and correct if necessary to minimum 5 bar. A water collector is mounted underneath the regulator (glass tube). It should be checked regularly and emptied if needed

by pressing the knob at the bottom. If there `s always a bit of water, please check the supply or mount a water separator in front of the inlet.

A pressure switch is mounted on the regulator unit which stops the machine as soon as the pressure drops below approx. 4 bar. The machine cannot be restarted unless the pressure is OK again.

Coating trough pressure:

The coating troughs are pressed horizontally against the mesh by individual regulated pneumatic cylinders. General rules are : The longer the troughs, the higher the used pressure should be.
Suggested bandwidth : approx. 3 - 6 bar

3.6 Performance test



CAUTION

all limit switches have been factory adjusted and tested. Due to safety rules all functions must be checked carefully prior to the operation of the machine (see 5.2 and 5.3).

Mount the magnet rod (21) low into its holder (22) on the upper frame holder, the magnets facing to the right hand tower.

Check the limit switch functions for the following positions carefully by short movements near them (only manual, not within a program):

Coating carriage (8): Drive manually down until the lower limit switch (16) stops the movement. Drive up again until the first magnet on the rod (21) stops the carriage. The upper frame holder must not sit on its upper limit switch for this, otherwise it is blocking the function.

Attention :

The magnet should only keep a distance of 3 to 4 mm to the magnet switch (19), otherwise the rod is may bent and has to be corrected.

Upper
frame holder (30) : to move it in either direction, all the clamps have to be open. Drive manually up with foot pedal or “ F1 ” until the limit switch (23) stops.

Attention:

If the upper frame holder sits on this switch, it is not possible to start any program.

Drive down again (foot pedal or F2) until the first magnet on the rod (21) stops. If a frame is inserted, the built in free wheel protects the drive from overloading.

Dryer (25) Drive up manually (F1), until the upper limit switch (24) stops.

Attention:

Before starting any program, the drying unit needs to sit on the limit switch (otherwise the start is disabled)!

Drive down (F2) until the lower limit switch (29) on the ramp (32) stops again.

If needed, adjust the described switches / magnets until they function properly. The other magnet switches , not yet covered, can only be checked during a running program.

Important: Allow the test program to run without coating troughs so that all functions can be tested.

4) Setting up and preparation



ATTENTION

correct adjustment of the machine and frames is very important to avoid any damage and to get perfect coating results. Use suitable equipment to handle large and heavy screens.

Before coating any screens, prepare the machine as follows:

Centring and fixation of the screens

The frames must be centred exactly within the machine. Loosen the clamps and shift them to approximately 15% of the frame width inside the frame edges (if more than 2 clamps in line are used, spread them symmetrically over the frame width). Tighten the knurled screws again to ensure proper fixation of the clamps (top and bottom).

If you have a series of frames with the same format, you can set the supplied “stopping pin” for quick centring. For large and heavy frames or frames with varying formats, you may only use markings on the machine.

Hold the frame centred and vertically, the mesh facing towards the rear side of the machine and drive the upper frame holder carefully down onto it. Close the clamps with the foot pedal.

Adjusting of the effective coating area and avoiding collisions

To achieve a certain coated area and to avoid collisions between coating troughs and frames (bottom and top), carefully follow the instructions below.

On the front, left bottom of the coating carriage there are two height adjustable magnet switches (18/19) mounted. The rear one is responsible for the “coating start position” (bottom), which is activated by the movable magnet (13) on its rail.

The front one stops the coating carriage just at the end of the aimed coating, activated by the first magnet on the rod (21). The second magnet on this rod

then finally stops the upward movement after the scrape off process of the coating trough`s.

Coarse frame size adjustments are made either by shifting the magnet (13) for the bottom (start), or magnet rod (21/22) for the top (stop).

For small adjustments the magnet switches can themselves be moved in opposite directions (knurled screws).

Tip : To make basic adjustments on frames, only attach the red trough on the squeegee side (front). Turn down the squeegee pressure to zero and start a coating program. After reaching the start magnet (as well as the stop at the second magnet at the top), press " F4 " to interrupt the program. Move the trough parallel by hand towards the mesh and check the clearance to the frame. Adjust further if necessary.



DIRECTIONS	if the clearance is too small, at least the trough on the squeegee side collides with the frame and can be damaged. Always make sure that the mesh faces towards the back
-------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Coating troughs / emulsions

Select the appropriate coating troughs (1.2) and fix these to the supporting profiles (red in front / black at the back)

Remove the edge protectors before filling with emulsion and attach them again after cleaning.

Fill the troughs sufficiently with emulsion. The maximum filling capacity is approximately 1 litre per meter length. For the best coating results please contact the emulsion supplier or read the emulsion data sheets.

5) Manual mode (movements)



WARNING

All keys which take direct actions, are generally protected against operating errors. The coating carriage is protected by a slide clutch against overload and the upper frame holder has a free wheel drive downwards. Nevertheless, always check the situation before any action. Never stay too close to the yellow/black marked area unless the carriage is in home position !

5.1 Screen fixation



DIRECTIONS

Always insert screens with the mesh facing to the rear. If possible, rather use portrait than landscape format.

The frame holding clamps (27/11) are activated by the foot pedal (12). Each following impulse by this pedal opens or closes the clamps. The upper frame holder can only be moved with open clamps, whilst a program can only be run with closed clamps.

5.2 Upper frame holder

Up :

Press “ F1 ” in the main menu (manual mode) then “ F1 ” (upper frame holder) and finally “ F1 ” (frame holder up). The upper frame holder moves upwards as long as you press this key or until the upper limit switch is reached. The same happens if you drive up with the foot pedal “ up “.

Down : The first two steps are the same as above. Then press “ F2 “ (frame holder down). The upper frame holder moves down as long as you press this key or until it reaches the inserted frame or the magnet switch (19).

ATTENTION : **Both directions only work with open clamps !**

It the upper frame holder is supplied with a “ slow speed ” option (high formats), its speed can be reduced (fixed speed) by pressing the “ slow ” button on the operating console.

5.3 *Coating Carriage*

Up : Press “ F1 ” in the main menu (manual mode), then “ F2 “ (coating carriage) and finally “ F1 ” (carriage up). The carriage moves upwards as long as you press this key or until it reaches the first magnet (21) or the limit switch (29) of the heater (if fitted).

Down : The first two steps are the same as above, then press “ F2 “ (carriage down). The carriage moves down as long as you press this key or until it reaches its limit switch (16) at the bottom.

5.4 *Dryer*

Up : Press “ F1 ” (manual mode) in the main menu, then “ F3 “ (dryer) and finally “ F1 ” (dryer up). The dryer moves upwards as long as you press this key or until it reaches its upper limit switch (24).

Down : The first two steps are the same as for up, then press “ F2 ” (dryer down). The dryer moves down as long as you press this key or until it reaches its lower limit switch (29) on the ramp (32).
The dryer is active during the downwards movement.

6) Manual pneumatic functions (for maintenance only)

6.1 *General*



DIRECTION

these functions should only be used if the carriage is approximately **50 cm** above its start position (collision). Before returning the carriage to the home position again, make sure to first reset all the cylinders !

ATTENTION

never use both coating troughs at the same time if there is no mesh in the frame (scratches)

Manual movement of pneumatic cylinders

Press “ F3 “ (set up) in the main menu. Then insert the needed code “ 425 ” in the following order:

Press the “ + ” key five times until you read “ 4 ”, then press the “ << ” key once and press the “ + ” key until you read “ 5 ”. Once again press the “ << ” key and finally insert the number “ 2 ” in the same way (order 4, 5, 2).

After pressing “ enter “ you are in the programming mode.

Press “ F1 ” (manual functions), choose the following on the display:

6.2 *Coating troughs in / tilting up*

Troughs horizontal :

Press “ cursor ” to get it blinking beside the “ trough horizontal “. Press the “ + ” key once, “ 0 ” changes to “ 1 ” (active). Press “ enter ”, then drive the troughs horizontally to the centre by stepping on the foot pedal

“ upper frameholder up ”. To drive the troughs out again, press the same foot pedal a second time. Both troughs work at the same time.

Troughs tilting: Use the same procedure as for horizontal movement. Observe that after “ driving troughs horizontal ” this movement has to be de-activated (to zero) before you can set “ troughs tilting ” to “ 1 ” (active).

Attention: Drive both trough holders back to home position and set both to zero (passive) by “ enter ” before leaving this program.

6.3 *Frame holding clamps*

A standard machine consists of one pair of clamps at the top and one pair at the bottom. All 4 clamps are opened and closed at the same time. If there is more than 1 frame in the machine (up to 6 frames), each single frame is independently switched (frame holder 2 to 6). By activating each single station with “ 1 ” and “ enter ” they will close, with “ 0 ” and “ enter ” they will open again.

6.4 *Edge cleaning system*

Edge cleaning system should only be activated if the troughs are in home position (collision!).

Edge cleaning dry consists of a rubber lip, where as edge cleaning wet consists of a wet sponge. Both are driven pneumatically along the trough edges to clean off the emulsion after coating.

Activating / de-activating is done as with the clamps, by using “ 1 ” and “ 0 ”. SS means squeegee side, PS printing side. Reset both to the home position (SS right and PS left) before continuing.

7) **Programming**

7.1 General

There are 20 programs available for each application.

Set programs are stored in the memory until they get changed manually. The only parameters that have to be set manually are the individually adjustable coating trough pressures against the mesh (pressure gauges on operating panel)

Attention: For your safety and comfort store all parameters for each program on a separate record sheet.

Entering programming menu: see chapter 6.1, manual movement

7.2 Direct coating (wet / wet)

After entering the programming menu, press “ F2 “ (programming) and then “ F1 ” (direct).

By pressing the “ + ” or “ - ” key, choose a program number and then press “ F4 ”.

The following parameters show up on the left and the according values to be selected on the right.

Coating PS :	1	Number of coatings on the printing side (0-99)
Coating SS :	2	Number of coatings on the squeegee side (0-99)
Coating Speed :	150	Coating speed in cm/min (50-950 cm / min)
Delay time start :	5	Tilted up position of the troughs on the mesh prior to coating in sec (0-99 sec)

After each input, press “ enter ”, when all four parameters are set, press “ cursor ” and then “ scroll down ” to show the next page :

Emulsion return :	5	Tilted down positions of troughs on the mesh after coating and prior to scrape off in sec (0-99 sec), generally identical to “ delay time start “
Edge Cleaning :	6	Time in sec (0-99 sec) in which the edge cleaners drive in one direction (according to length of trough being used). Same time again for return

Press " cursor " and " scroll down " to select another program for programming or " scroll back " to return to the main menu again.

7.3 *Capillary film sheet*

This option must first be activated (chapter 7.11). After entering programming menu (chapter 6.1), press " F2 " (programming) and then " F4 " (capillary sheet).

The following parameters show up:

Coating PS :	01	Fixed value, sheet application at the end of the program (last action)
Coating SS :	2	Number of initial coatings on squeegee side (0-99)
Speed sheet :	150	Speed of coating and sheet application in cm/min (50-950 cm/min)
Delay time start :	4	Tilted up position of coating troughs prior to coating / application in sec (0-99 sec)

Press " cursor " and " scroll down ".

Emulsion return and edge cleaning as in chapter 7.2

7.4 *Direct coating / drying (option)*

This option must first be activated (chapter 7.11). After entering the programming menu (chapter 6.1) press " F2 " and then " F2 " again (direct / dryer).

Select the program No. and press " F4 ". Select " F1 " (alternating) or " F2 " (final drying)

" F1 " : **alternating**

In this mode you can select initial coats with following drying, then further coats with intermediate drying and then a final drying.

The following parameters show up:

Initial coats PS :	1	No. of coatings on printing side (0-99)
--------------------	---	-------------------------------------------

Initial coats SS : 2 No. of coatings on the squeegee side (0-99)
Initial drying : 2 No. of drying cycles after initial coats (0-99)

Press “ cursor ” and “ scroll down ”

Coating PS : 2 No. of coatings on PS (0-99)
Coating SS : 1 No. of coatings on SS (0-99)
Interm. drying : 3 No. of drying cycles after every coating (0-99)
Final drying : 5 No. of drying cycles after the last intermediate drying cycle

Press “ cursor ” and “ scroll down ”

Delay time start : 4 Tilted up position of troughs prior to coating
Coating speed : 250 Coating speed in cm/min (50-950)
Drying speed : 200 Drying speed in cm/min (50-950)

Press “ cursor ” and “ scroll down ”

Emulsion return and edge cleaning as in chapter 7.2

Delay time dryer : 3 Waiting time of the running dryer on top and at the bottom of the frame in sec (0-99)

“ F2 “ : **final drying**

In this mode after coating has been finished you can select final drying:

Coating PS : 2 No. of coatings on PS (0-99)
Coating SS : 1 No. of coatings on SS (0-99)
Final Drying : 5 No. of drying cycles after coatings (0-99)

Press “ cursor ” and “ scroll down ”

Delay time start : 4 Tilted up position of troughs prior to coating
Coating speed : 250 Coating speed in cm/min (50-950)
Drying speed : 200 Drying speed in cm/min (50-950)

Press “ cursor ” and “ scroll down ”

Emulsion return : 4 Tilted down position of troughs after coating in sec (0-99)
Edge cleaning : 6 Time in one direction in sec (0-99)

Delay time dryer : 3 Waiting time of the running dryer on top and at the bottom of the frame in sec (0-99)

7.5 *Edge cleaning - dry (option)*

This option must first be activated (chapter 7.11). Programming see within programs.

7.6 *Edge cleaning - wet (option)*

This option must first be activated (chapter 7.11) programming see within programs.

7.7 *Capillary film roll application (option)*

This option must first be activated (chapter 7.11). After entering programming menu (chapter 6.1) press “ F2 “ and then “ F3 “ (capillary roll).
Select program No. and press “ F4 “ :

Coating PS :	01	Fixed value, film roll application at the end of the program (last action)
Coating SS :	2	No. of coatings on SS, prior to film application (0-99)
Speed roll :	250	Speed of coatings and film application in cm/min (50-950)

Delay time start: 4 Tilted up position of troughs prior to coating

Press “ cursor ” and “ scroll down ”

Emulsion return: 4 Tilted down position of troughs after coating in sec (0-99)

Edge cleaning: 6 Time in one direction in sec for the cleaner as well as the knife after the film application to cut the film on the roll.

7.8 *Middle supporting cylinder, wide machines (option)*

This option must first be activated (chapter 7.11). These cylinders are always pushed passively in and out by moving / tilting troughs but support coating and scrape off when activated.

7.9 *Multiple coating (option)*

This option must first be activated (chapter 7.11). Only activate the No. of frameholders corresponding with your foot pedals / clamps. All others should be set to " 0 " (passiv).

7.10 *Language*

After entering the programming menu (chapter 6.1) press " F3 " (language). " Scroll down " until you find the desired language. Press " cursor " and insert the No. of the language, press " cursor " again and the " F4 ". Now you are in the main menu in the new language.

7.11 *Activating / de-activating options*

Observe: To avoid malfunctions, only trained staff are allowed to change options. To only check the status of the options, see chapter 11 (machine data)

After opening the programming menu (chapter 6.1), press " F4 " (options). Enter special code " 300 " the same way as for " 425 " (chapter 6.1).

Now all options can be activated by inserting " 1 " or de-activated by inserting " 0 ". Always press " enter " after any changes. Press " scroll down " to see the other 3 pages.

8) Program - cycles

8.1 *General*

Prior to any program start, prepare the machine according to chapter 4 (plus possibly specialities for each application)

The following conditions have to be set in any program, otherwise a start is impossible and the display shows “ machine is not ready ” :

- All clamps must be closed
- Upper frame holder must not sit on its upper limit switch
- Dryer must be on its upper limit switch (dryer option)
- Coating carriage must be on its lower limit switch
- All used options must be activated
- No failure indications should be read on the display

8.2 *Direct coating (wet / wet)*

Press “ F2 ” (automatic) in the main menu and then “ F1 ” (direct). Choose the desired program No. and press “ F4 “ again. Now the program starts in the following sequences :

- Coating carriage drives up above and then returns down on to the “ start ” magnet
- One or both troughs moves onto the mesh and tilt up
- During the programmed “ delay time start ”, the emulsion flows towards the mesh
- After elapsed “ delay time ”, the coating starts with preset coating speed
- The carriage stops at the first magnet (rod) and the troughs tilt down. The emulsion flows back into the troughs during “ emulsion return ” time
- With preset slow speed, the troughs get scraped off on the mesh until the upper magnet (rod) is reached
- The troughs return out to home position
- If edge cleaning (option) is available, the trough edges get cleaned in both directions
- The carriage drives down with max. speed onto the “ start ” magnet, starts another coating cycle or continues at slow speed down onto its limit switch.
- A beeper indicates the program end, by pressing “ F4 “ a new screen can be coated

During a running program, the display shows the actual program No., the coating speed and the still remaining coatings on either side.

8.3 *Capillary film sheet*

Press “ F2 “ (automatic) in the main menu and then “ F4 “ (capillary sheet). Choose the desired program No. and press “ F4 “ again. Now the program starts in the following sequences :

- If the mesh gets pre-coated on the squeegee side (SS), it is first a normal coating on this side (chapter 8.2)
- After the last pre-coating on the SS, the empty trough on the printing side (PS) will push the film sheet (which has to be held horizontally over its edge already during the downwards movement) onto the mesh. By moving upwards, the film will be pressed onto the wet precoating.

If the mesh is already wet or pre-coated, you can also apply a film sheet directly by programming “ 0 ” coatings on the SS and not to insert a trough there.

8.4 *Direct coating / drying*

Press “ F2 “ (automatic) in the main menu and then “ F2 “ (direct/dryer),

choose the desired program No. and then press “ F4 “. The program now starts in the following sequences :

- a) Within programs “ **alternating** ”
 - Initial coating as under (chapter 8.2)
 - After the last initial coating, the dryer drives down fast to the magnet on the upper frame holder, stops there and lets the “ delay time dryer ” (heat up) elapse.
 - Then it drives down onto the limit switch on the coating carriage with the programmed speed, waits again for the “ delay time dryer ” to elapse and then drives up again to the upper magnet with the same speed (1 cycle).
 - After the last initial drying cycle , the dryer drives up, onto its limit switch with maximum speed and then stops.

- Now coating continues with intermediate drying after each coat (same as initial coating).
- After the last “ intermediate drying ”, a final drying is possible.

During a running program, the display shows the actual program No., the coating speed and the still remaining coatings and dryings.

PPS	(Initial) pre-coating on printing side
PSS	(Initial) pre-coating on squeegee side
PDR	(Initial) pre-drying
PS	Coating on printing side
SS	Coating on squeegee side
DR	Dryings (intermediate and final)

b) Within programs “ **final drying** ”

- Direct coating as under chapter 8.2
- At the end of all coatings, the final drying starts (same as with “ alternating ”)

During a running program, the display shows the actual program No., the coating speed and the still remaining coatings and dryings:

PS	Coatings on printing side
SS	Coatings on squeegee side
DR	Dryings (final)

8.5 *Capillary film roll application*

Prior to any film applications, the following preparations are needed:

- Mount a HARLACHER film application machine onto the rear trough holding profile (PS)
- The film needs to hang out of the rubber cylinder by approximately 20mm (downwards)
- The film must be centred to the screen carefully

- The rubber cylinder should be 40mm away from the screen frame (do not roll on the frame)
- The coating trough for the pre-coating (SS) should be at least 10mm shorter than the film width, so as to keep the cylinder clean. Fill the trough on the squeegee side (SS)

Press “ F2 “ (automatic) in the main menu and then “ F3 “ (capillary roll). Choose the desired program No. and press “ F4 “. The program now starts in the following sequences:

- Pre-coating with emulsion on SS (8.2)
- After the last pre-coating, the trough on the SS stays passive, the film gets pressed onto the wet screen (PS) and is then rolled upwards until the first magnet (rod) stops it (speed is the same as for coating)
- The film then gets cut during the programmed time for “ edge cleaning ”
- The cut film then gets pulled out of the film machine during the “ scrape off ” phase (second magnet) and is also rolled onto the screen
- The film application machine moves off the screen and the carriage drives down to its home position with maximum speed

8.6 *Multiple Coating*

Prior to the start of a multiple coating process, all clamps need to be closed (even if not all stations are being used). The coating process is the same as in all the other programs.

9) Interrupting a running program

- By pressing **F4** :The coating carriage stops and the troughs are tilting down. The display shows “ program interrupted ”. By pressing “ F4 “, the troughs move out again (allow enough time for flow back of emulsion). Now the “ manual mode “ menu is open and the desired movement can be made.
- By pressing **emergency stop** : The coating carriage stops and the troughs are tilting down. The power supply is completely cut out and has to be reset by turning the emergency knob.

The troughs then move out again and you can continue as above (manually).

10) Function monitoring and error messages

The following functions are constantly monitored and some are even shown in the display:

- Pressure loss in the pneumatics below 4 bar “ no air pressure ”
- Missing or drop in voltage supply
- Failure within CPU
- Overload of electric motors “ motor protective switch “
- Overload / failure of frequency transformer



CAUTION	If a failure occurs, check the reason carefully before continuation of work !
----------------	-------------------------------------------------------------------------------

10) Manufacturer – and machine data

Press “ F4 “ in the main menu (information), press “ F1 “ (type of machine) and you can see the software versions (CPU / text), “ scroll down ” to only read the status of the options, the No. of cycles and total operating hours.

“ Scroll back ” and then press “ F2 “ (producer) to find the address, telephone and fax No’s. as well as the e-mail address of the manufacturer.

“ Scroll back ” and then press “ F3 “ (time / date) to read the actual time and date.

11) Maintenance instructions



DIRECTIONS If you follow the given maintenance instructions carefully, the machine will work satisfactorily over a long time period.
Disregarding these instructions can lead to a warranty regress!

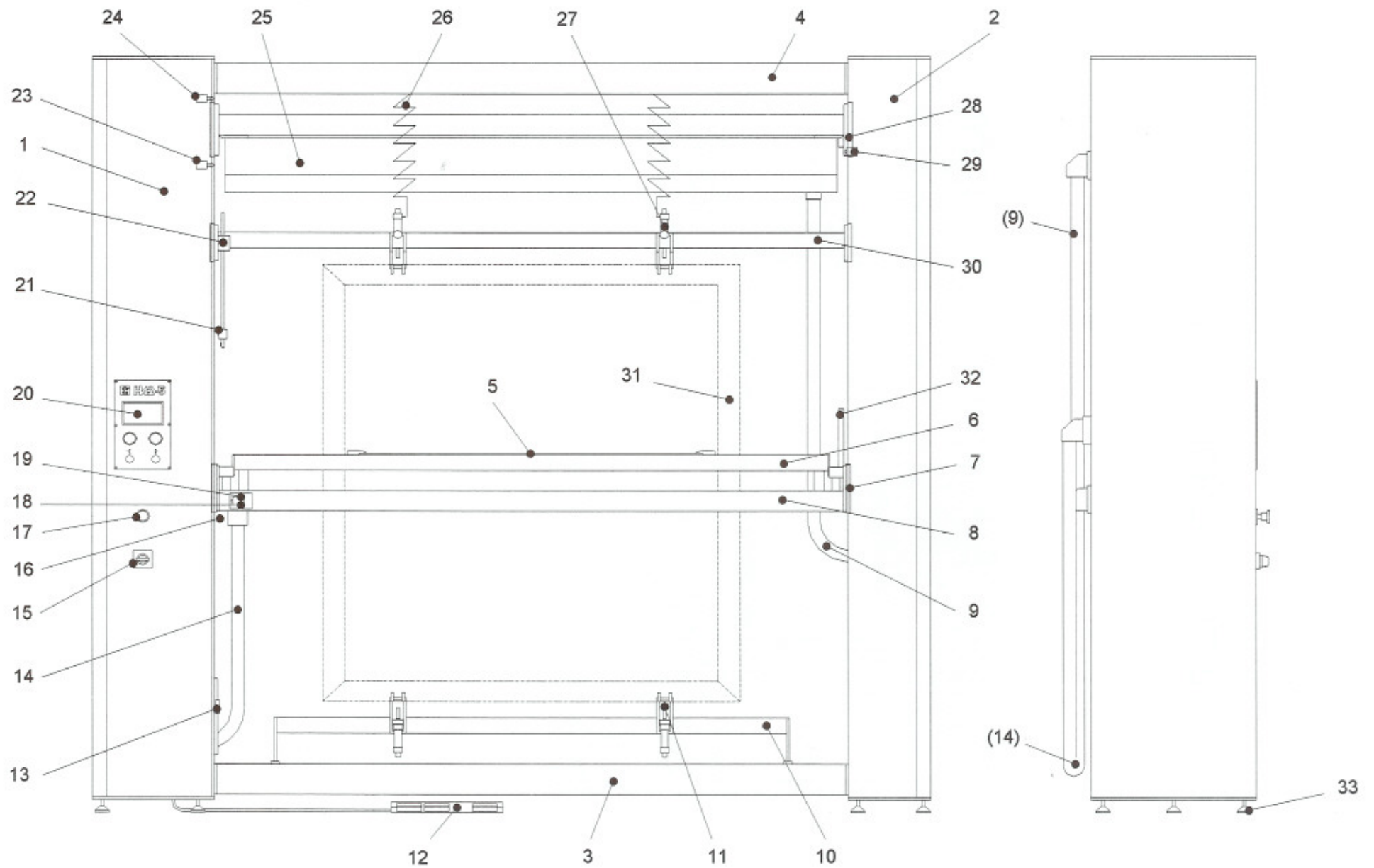
General: Always keep the machine clean and dry, especially after spilling emulsion. Immediately clean the emulsion with water and dry completely. Blank metal pieces have to be oiled or greased slightly.

Periodic checks, cleaning and lubrication schedule

- Daily:**
- Wash troughs out immediately after use.
 - Clean the rubber squeegee for edge cleaning dry, or wash the sponge and quick release water tank for edge cleaning wet.
- Weekly:**
- Check the water absorber in the control tower and empty it by using the knob underneath if necessary.
 - Visually check all moving parts for tightness, tension of the drive belts and horizontal (levelling) position of carriage / dryer / upper frame holder.
- Monthly:**
- Clean all the guide rails and thinly coat them with " Molykote Longterm W2 " grease.
 - Clean cylinder rods and linear guides for the coating trough holders and lightly oil them with " WD 40 " or equivalents.
 - Remove the filters on the side plate of the heaters and clean or replace them (if dirty air is present, may shorten this intervall.

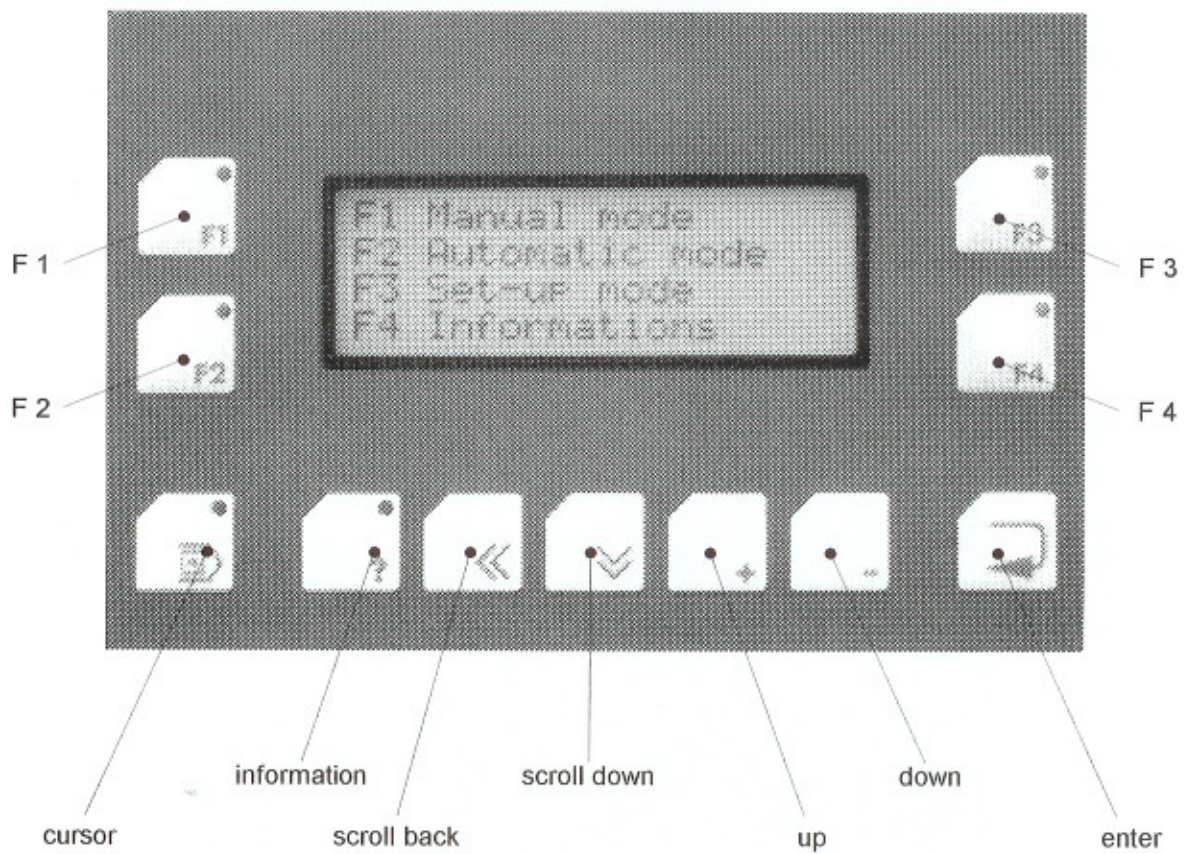


CAUTION Collision damages have to be checked and repaired immediately !
If you are in doubt, please contact HARLACHER Ltd. or its agent for assistance.

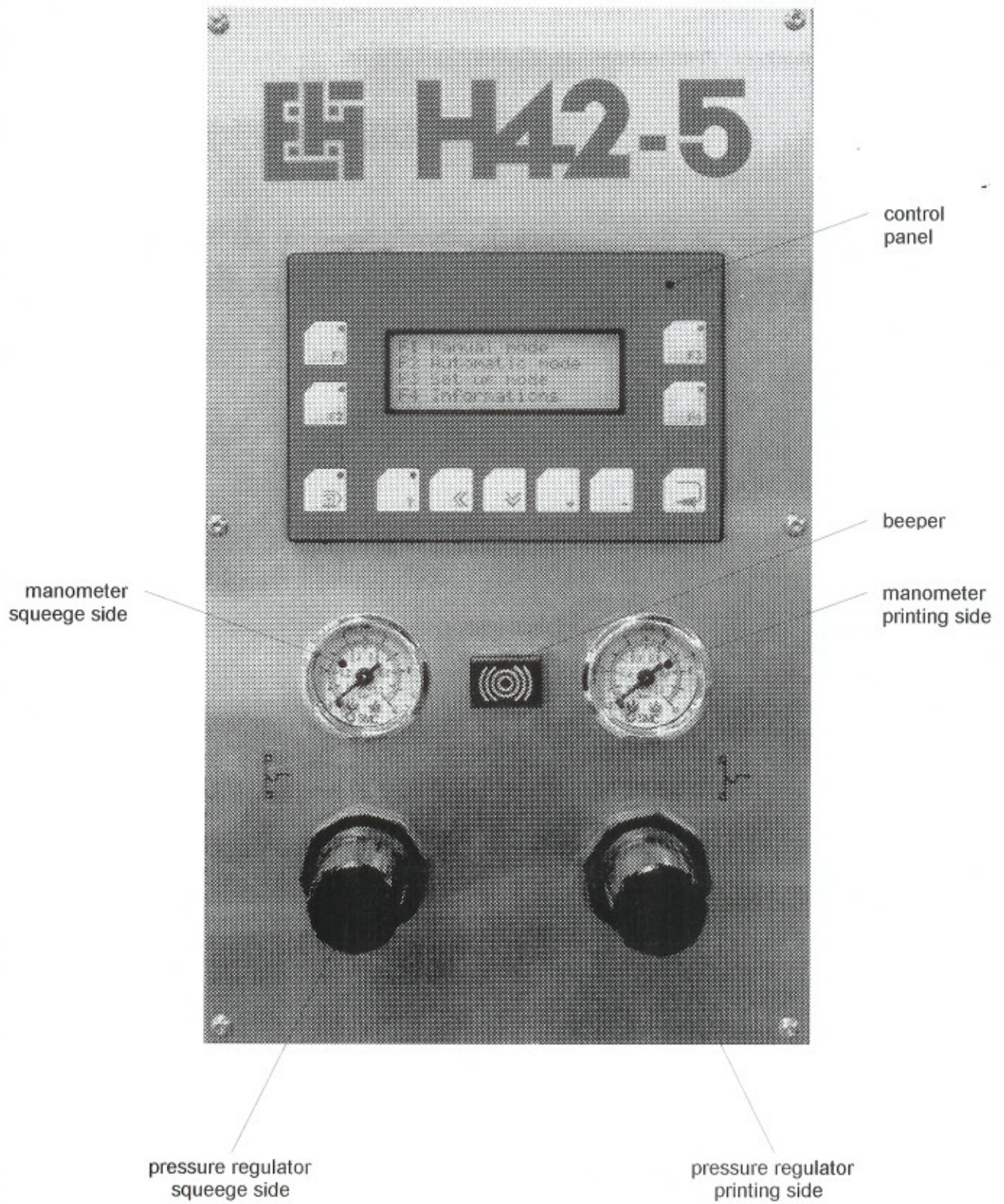


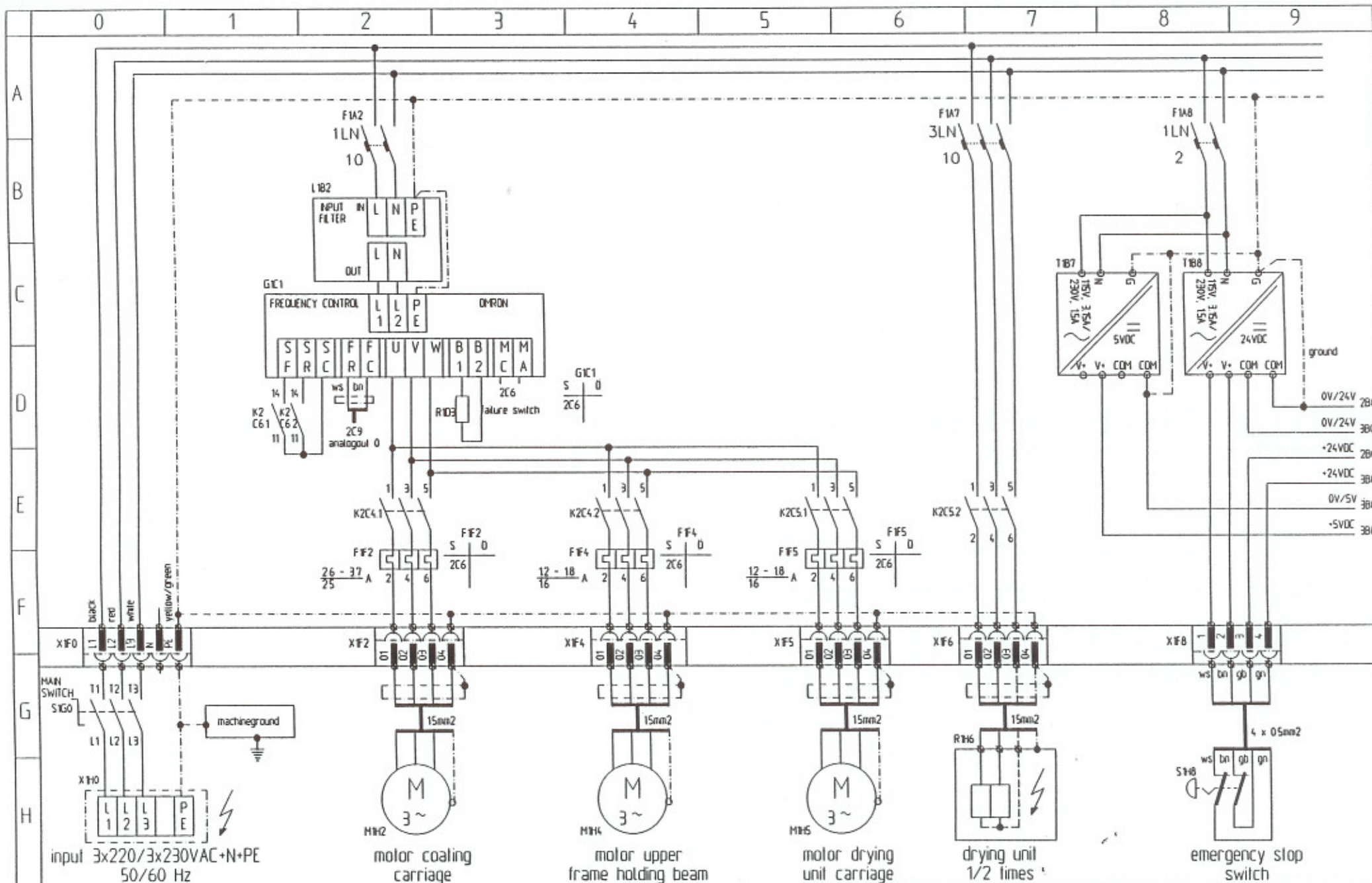
H 42-5 Overview	Zeich. Nr.	H 42-5.001
Harlacher AG	18.04.01	R. Fischer

Terminal OMRON H42-5

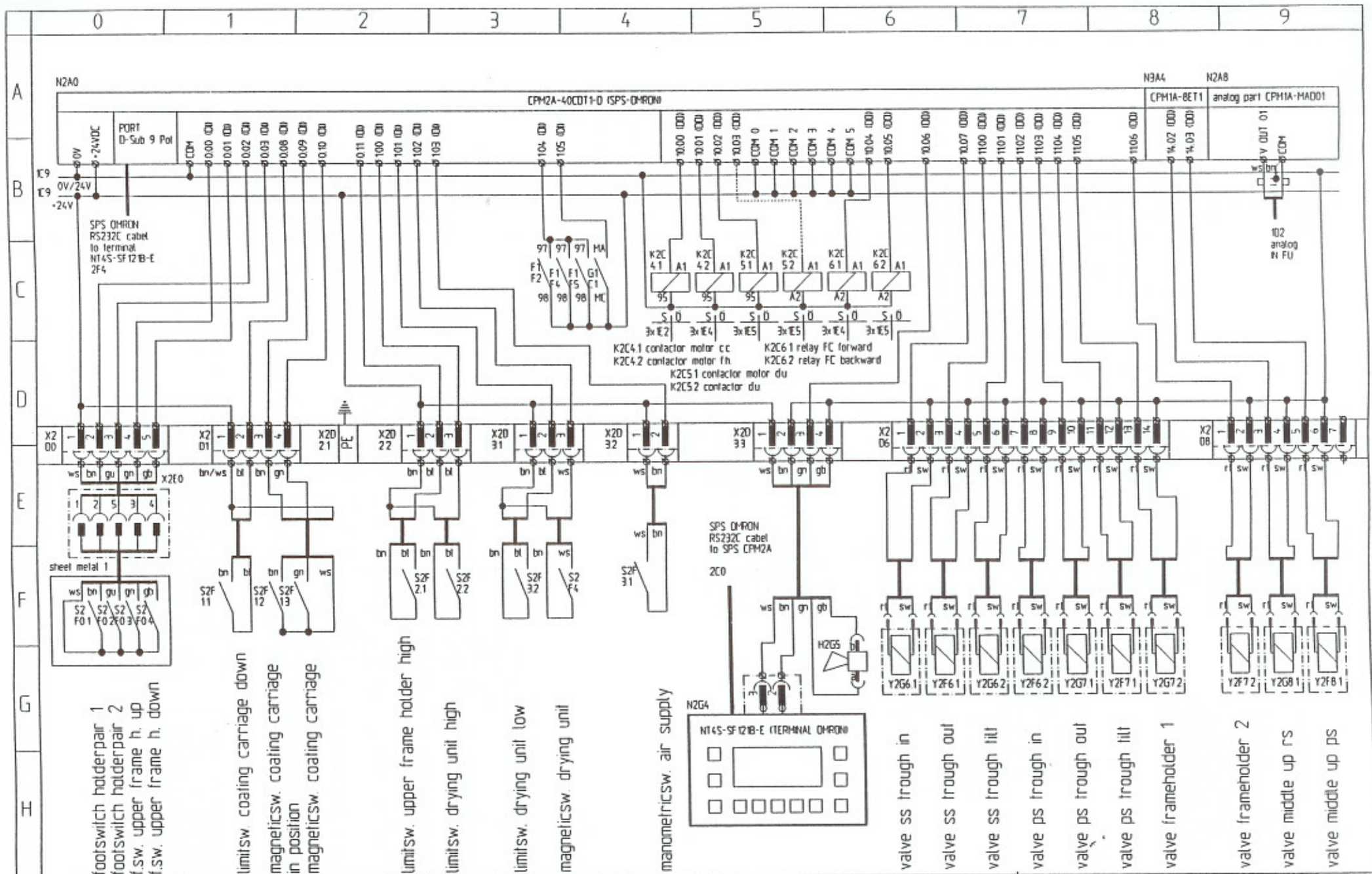


Operating Panel H42-5



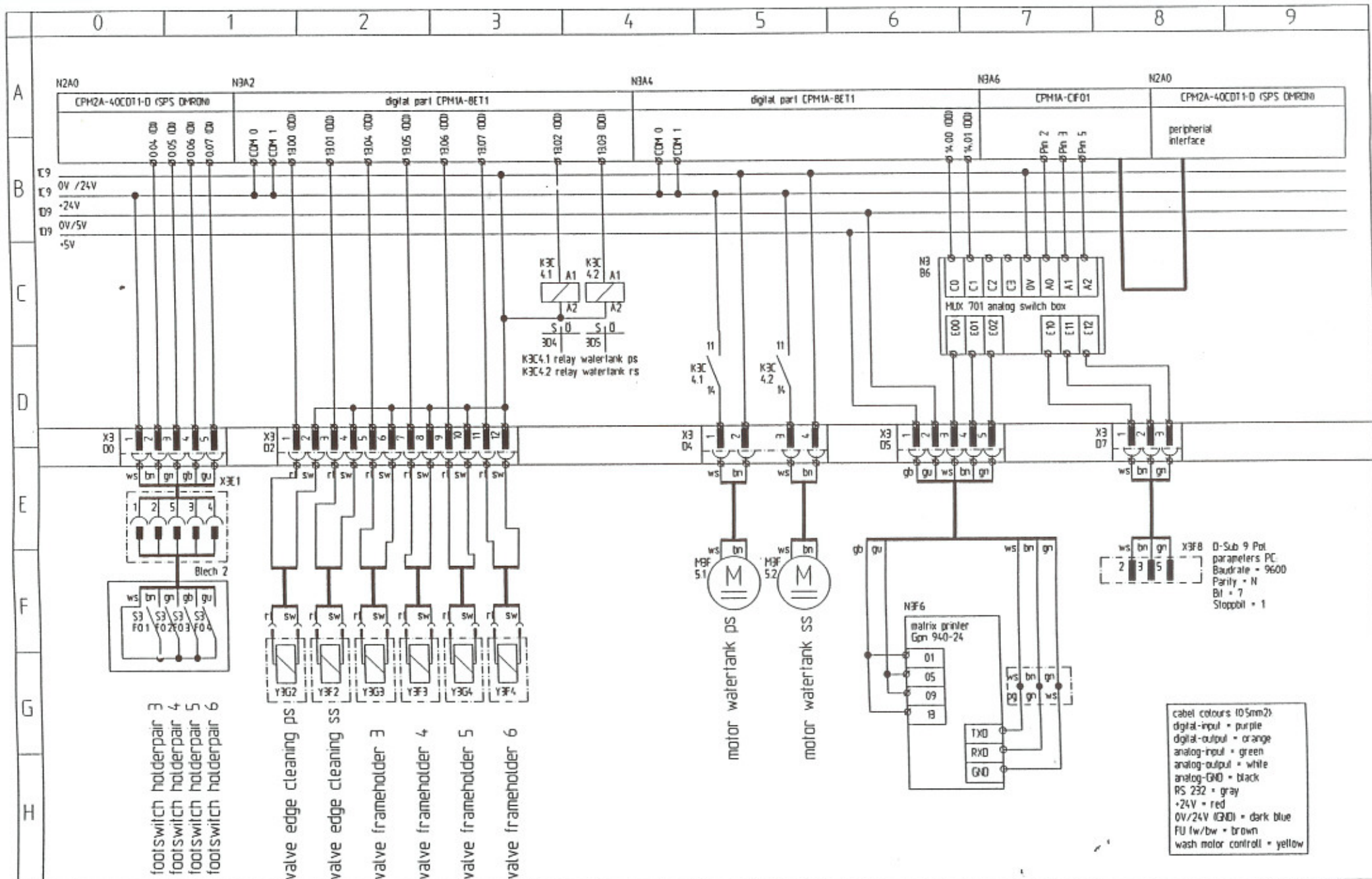


Projekt/Anlage	Z-Nr.	Erstellt am	Letzte Änderung	Revision	Seite
HARLACHER AG, H42-5, 3x220/3x230VAC, 50/60Hz	425cbse0	7. August 2000 / Fs	3. Januar 2001 / Eg		01 von 03
IMETRON AG, OBERDORFSTRASSE 4, CH-3855 BRIENZ					



Projekt/Anlage	Z-Nr.	Erstellt am	Letzte Änderung	Revision	Seite
HARLACHER AG, H42-5 standard options drying unit, holderpair 2, middle up	425_ase1	7. August 2000 / Fs	8. August 2000 / Fs		02 von 03

IMETRON AG, OBERDORFSTRASSE 4, CH-3855 BRIENZ



footswitch holderpair 3
 footswitch holderpair 4
 footswitch holderpair 5
 footswitch holderpair 6

valve edge cleaning ps
 valve edge cleaning ss
 valve frameholder 3
 valve frameholder 4
 valve frameholder 5
 valve frameholder 6

motor watertank ps
 motor watertank ss

cabel colours (0.5mm²)
 digital-input = purple
 digital-output = orange
 analog-input = green
 analog-output = white
 analog-GND = black
 RS 232 = gray
 +24V = red
 0V/24V (GND) = dark blue
 FU (w/bw) = brown
 wash motor controll = yellow